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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/566,470	01/31/2006	Fumihito Yaguchi	00380487PUS1	3906
2292 7590 04/11/2008 BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747				
EXAMINER				
STIMPERT, PHILIPPEARL				
ART UNIT		PAPER NUMBER		
3746				
NOTIFICATION DATE		DELIVERY MODE		
04/11/2008		ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary

Application No.

10/566,470

Applicant(s)

YAGUCHI, FUMIHIRO

Examiner

Philip Stimpert

Art Unit

3746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 January 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 January 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-85/86)
Paper No(s)/Mail Date 1/31/2006, 4/10/2006
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Inventor's Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the plural detecting coils of claim 2 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

2. Claim 1 is objected to because of the following informalities: lines 7-8 recite "characterized in, that an..." This phrase should not be broken by a comma. Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:
- The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
4. Claims 1-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
5. Regarding claim 1, the end of the claim recites "said electromagnetic coils." While line 3 recites "an air-core electromagnetic coil" and line 8 recites "an air-core detecting coil," it is not clear that antecedent basis for the plural recitation of "coils" on the last line has been established, which lack of clarity renders the claim indefinite.
6. Regarding claim 2, lines 2-3 recite "said detecting coils." The only previous recitation of a "detecting coil," in line 8 of claim 1 is singular. Thus the plural detecting coils of claim 2 disagree in scope with the singular coil of claim 1, rendering claim 2 indefinite.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roth et al. (4,965,864) in view of Wright (US 4,864,849) and Ohki et al. (US 5,302,872).

9. Regarding claim 1, Roth et al. teach an electromagnetic pump (generally shown in Fig.1) comprising a cylinder (3), a moving member (5) being movably accommodated in the cylinder (3), the moving member having a permanent magnet (col. 3, ln. 36-37), electromagnetic coils (1) fitted around the cylinder (3), the electromagnetic coils (1) reciprocally moving the moving member (1) in the axial direction when electricity is supplied to the coils (1, see col. 3, ln. 36-40), and pump chambers formed in the cylinder (3, to the left and right of the piston 5, delimited by valve heads 8) for sending a fluid. Roth et al. also teach control circuitry (12), and that the control circuitry may include piston position sensors (col. 3, ln. 52). Roth et al. do not teach any particular type of piston position sensor, nor that their electromagnetic coils are air-core coils.

Wright teaches a viscometer, which measures viscosity of a fluid by detecting the position of a bob. In particular, Wright teaches that a circuit may be attached to the electromagnetic driving coils of the bob, so as to "detect bob position by monitoring the mutual inductance between drive coils whose mutual inductance is affected by the position of the bob, which contains ferromagnetic material," (col. 2, ln. 50-53). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the drive coils of Roth et al. as the position sensors desired by Roth et al., in the manner taught by Wright. Thus, the electromagnetic drive coils would also serve as detecting coils.

Ohki et al. teach the use of air-core coils in a linear motor. Ohki et al. also indicate that air-core coils and ferromagnetic core coils are generally interchangeable (col. 3, ln. 14-17) and are useful in producing linear motion. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use air-core coils as taught by Ohki et al. as the electromagnetic drive coils of Roth et al., in order to produce linear motion of the piston of Roth et al.

10. Regarding claim 2, Roth et al. teach a plurality of electromagnetic coils (1) fitted around the periphery of the cylinder (3) as shown in Fig. 1. According to the combination, as taught by Wright, the electromagnetic coils are themselves the detecting coils, and thus may be considered to be provided close to their axial end faces.

11. Regarding claim 3, Roth et al. teach that the medium into which the electromagnetic driving coils (and detecting coils, in the combination) are set may be provided with iron filings (cols. 3-4, ln. 60-2), thus forming a yoke made of magnetic materials provided to the axial end faces and outer circumferential faces of the coils.

12. Regarding claim 4, the induced voltage in each detecting coil would inherently be twice as high as the frequency of the reciprocation of the moving member (5) of Roth et al., since the voltage is induced by motion of the moving member (5) relative to the coils (1), which motion will take place twice per reciprocation cycle.

13. Regarding claim 5, none of the presently combined references explicitly teach the detection of flow volume. However, Roth et al. teach that stroke length may be determined based on the input from the sensors of the pump (cols. 3-4, ln. 64-8). In a

cylinder of fixed diameter (as taught by Roth et al.), stroke length is directly proportional to flow volume, thus Roth et al. effectively teach that flow volume of their pump is detected on the basis of their sensors, which as taught by Wright detect induced voltage in the detecting coils (1).

14. Regarding claim 6, in the pump of Roth et al. as modified in particular by Wright, any nonzero flow (i.e. greater than a prescribed value of zero) volume of the pump is detected on the basis of a threshold value (i.e. greater than zero) of the induced voltage in the detecting coil (1).

15. Regarding claim 7, in the pump of Roth et al. as modified in particular by Wright, any reciprocation of the moving member (5), normal or abnormal, is detected based on induced voltage in the detecting coil (1), i.e. induced voltage greater than a threshold of zero.

16. Regarding claim 8, Roth et al. teach that the motion of the moving member (5), in particular the stroke length (cols. 3-4, ln. 64-8) is controlled on the basis of the input from the position sensor, which detects induced voltage, in particular over a zero threshold.

17. Regarding claim 9, the induced voltage detected by the coils (1) of Roth et al. as modified by Wright, must inherently fall within a detection range, else it would not have been detected. Further, since the detecting coil as taught by Wright is presumed to be functional, any variation in the induced voltage caused by magnetization of the coil would be presumed to be small enough as to allow operation of the detecting coil.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Philip Stimpert whose telephone number is (571)270-1890. The examiner can normally be reached on Mon-Fri 7:30AM-4:00PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on (571) 272-7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devon C Kramer/
Supervisory Patent Examiner, Art
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3 April 2008